

WITHIN OUR BORDERS

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The growth of modern civilization, bringing with it many comforts and conveniences, urbanization, and industrialization, has also made man aware of a potentially dangerous side-effect: pollution of the earth's air, water and soil.

Pollution, in its strictest sense, is the contamination of an element by foreign substances, and is normally associated with some activity of man. But man is not solely responsible. The haze often seen in the countryside is associated with plant life. Wind-borne dusts, salt spray and pollens are natural contaminants of the atmosphere. Dead vegetation and animal life may enter bodies of water. Nature, in her own way, can deal with those pollutants. But when foreign elements are introduced into the air, water or soil by man in quantities that are harmful to life, a pollution problem occurs.

Pollution has not bypassed Alberta. But the problem was recognized early, and corrective measures were started as much as 20 years ago. The first specific work on water pollution assessment and control was started in 1950. The program on air pollution control was initially inaugurated in 1957.

Pollution control work by many Alberta government departments has been developing continuously since then, and today it can be said this province's emphasis is on prevention of pollution rather than correction.

This issue of "Within Our Borders" examines the responsibilities of all the departments connected with the work of controlling the environment in which we live. □



Interested groups, government form pollution advisory committee

The subject of pollution is of immediate interest to a number of municipalities, organizations and association groups because of either direct involvement or direct interest in the possible adverse effects of pollution.

With this in mind, the Alberta government in 1967 established the Alberta Advisory Committee on Pollution Control with the Minister of Health as chairman. This committee, through its subcommittees was to critically review pollution problems and control programs and to make recommendations to the government through the minister.

The membership of the committee now stands at 110, and includes representatives from 12 provincial government departments, four federal government departments, and 21 municipal, university and association groups.

The whole committee has held annual meetings in 1967, 1968 and 1969. The subject of pollution is subdivided into 14 specific areas and each is considered in detail by a subcommittee. Specific areas of study include air pollution control in Calgary and Edmonton and river pollution control for the North Saskatchewan, Bow and Oldman Rivers. Other subcommittees deal with research, quality criteria, soil pollution, noise, and information and education.

Each subcommittee meets during the year and at the annual meeting makes a presentation including suggestions and recommendations.

The Advisory Committee represents in a very real way the opinion of a very substantial group of Alberta people and they are, therefore, able to indicate the type of pollution control desired by the people of Alberta.

Plumbing system control protects water supplies

Although Alberta's urban areas are equipped with sewage collection and treatment facilities, private sewage disposal facilities still exist, especially in the rural areas. The responsibility of protecting wells, lakes, streams, water-bearing strata and other sources of water from pollution which could result from the installation of private systems rests with the Plumbing Inspection Section of the Division of Environmental Health Services, Alberta Department of Health.

The provisions of the Provincial Plumbing and Drainage Regulations are such that raw sewage, or sewage effluent, must not be discharged onto the ground or into a possible water source. These regulations require that an approved form of ground absorption, or an approved sewage lagoon, be used for the disposal of effluent, whether it be from a private dwelling or a public or commercial building.

The regulations governing trailer coach parks, as well as holiday trailer parks, include sections which prevent the disposal of sewage or sewage effluent into the ground, or in any other manner which could cause a nuisance or create a pollution problem.

In order that assistance may be extended to those installing a sewage disposal system the Division of Environmental Health Service distributes, free of charge, a booklet which outlines the acceptable methods of private sewage disposal. This booklet is written in a simple straightforward manner in order that anyone may understand it.

This division also distributes a leaflet which outlines the distances various parts of a private plumbing system must have separating them when such a system is installed to serve lake cottages or similar installations. It is often necessary that sewage be collected in tight tanks in order to prevent polluting water supplies, lakes, streams or water bearing strata. The sewage from such tanks is then hauled away for disposal in modified landfills or other approved locations.

The ground absorption method of disposal for raw sewage requires the installation of a septic tank which separates the influent so that

liquid only is discharged for disposal. This liquid is then distributed through a system of pipes into the upper layers of the soil where the aerobic soil bacteria oxidizes the sewage, making it safe. This purification of the sewage effluent is actually a vital stage in the nitrogen cycle in which the complex organic proteins are broken down into simple and stable inorganic compounds. It is customary to follow this "field tile disposal system" with a cesspool in order to maintain control of the effluent which passes through the field.

The sewage lagoon method of sewage disposal consists of a large holding pond. The pond is designed to retain sewage for a least one year and relies on the combined actions of bacteria and algae to accomplish treatment of the sewage. The drainage of lagoons can only take place when the effluent will least affect the drainage course receiving it.

Buildings which discharge sanitary sewage to a private system are required to have the storm water drainage completely separate from the sanitary system. This separation prevents flooding of the private sewage disposal system and the creation of a pollution problem.

Legislation as it exists is such that pollution of water supplies, as well as sources of potable water, is almost impossible from the point of view of waste disposal from a plumbing system, whether this waste be discharged to a municipal sewerage system or to a private sewage disposal system.

"Within Our Borders" is a publication designed to acquaint the people of the Province with the administration of the Alberta Government.

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Research Council aids industry in control work

The Research Council of Alberta has, through the years, been involved in many small specialized pollution tests and experiments as well as two main pollution control programs.

In past years, the Council has monitored sulphur gases in the atmosphere emitted from gas processing plants. The Council has a fully instrumented trailer which is taken to the plant site. This program is being gradually phased out, however, since there are now competent private firms equipped to do this work.

Now, the Council is greatly involved in fluoride monitoring of the atmosphere, vegetation and cattle teeth and bones. This fluoride may be emitted from fertilizer plants. Before a plant goes into operation, a survey is done to establish the natural level of fluoride, and experiments after production is underway show how much the industry may have added to this level. These experiments are done at the request of industry, and paid for by them.

The Research Council has done many specialized jobs for industry in helping them solve pollution problems. An ongoing program to develop active carbons from coal to take the taste and odor from industrial effluent has resulted in a commercial operation now going into the production of these active carbons. Work is also being done on the use of coke in water filtration and clarification.

The Council co-operates with the University of Alberta Department of Sanitary Engineering in its pollution research.

Waste analysis primary function of EHS lab

Analysis of waste compounds discharged into air or water to ensure that they comply with permitted concentrations is carried out by the Environmental Health Services laboratory, Alberta Department of Health.

The laboratory receives test samples from the Air Pollution Control, Water Pollution Control and Municipal Engineering sections of the Division of Environmental Health.

The lab continuously checks monitoring devices from approximately 175 stations across the province which are able to pick up poisonous gases from the air, specifically sulphur gases. The concentration of these gases collected in the monitors is tested in the laboratory.

The lab also determines the oxygen concentration which a river requires for the oxidation of specific wastes discharged into it, to ensure that sufficient oxygen is present. Water is also analyzed for poisonous chemical elements or compounds which may be contained in industrial effluents. This enables the controlling section of the division either to disallow the discharge of such effluents, or to keep their concentration below a level at which they are not detrimental to health.

Another part of the laboratory work is the testing of pesticides and herbicides in water.

In 1969, a total of 6,062 samples were analyzed and 21,574 individual tests performed. The detection limits for chemical compounds in water or air are in the range of one part per million or even one part per billion, depending on the type of compound. Modern analytical methods and complex instruments are applied to detect very low concentrations.

Multiple effort ensures purity of Alberta foods

To ensure that foods produced and consumed by Albertans are uncontaminated by pollution in any form requires the concerted efforts of a number of agencies within the Alberta Department of Agriculture. Active in an extensive program of applied research and education to control pollution and safeguard farm products are the Department's Animal Industry, Plant Industry, Veterinary Services, Water Resources and Extension Divisions.

The Dairy and Food Laboratory of the Dairy Branch, Animal Industry Division, many years

ago established a program of monitoring all milk samples for radioactive fallout. For this, the laboratory progressed to a comprehensive program of testing all types of foods for residues which might prove hazardous to health. In addition to regular examinations of milk samples from all dairies in the province, for traces of antibiotic and pesticide residues, the Dairy and Food Laboratory maintains continuous laboratory research into such fields as pesticide residue in meats, honey, eggs, fruit and vegetables.

Working closely with the Dairy and Food

Laboratory is the Pest Control and Crop Protection Branch of the Plant Industry Division. Where laboratory tests identify pesticide residue in a food product, the source of the sample is determined and a representative of the Branch contacts the producer. He assists in locating the reason for the contamination and in eliminating it, whether it is in livestock, vegetables, fruit or milk.

Another agency of the Plant Industry Division, the Soils Branch, monitors the possibilities of soil pollutions from industrial effluents. Regular soil examinations, taken from agricultural areas near suspected sources, determine any changes which may indicate a pollution problem.

The Weed Control Branch of this Division assists in preventing pollution by recommending the type and application of herbicides used to control aquatic plant growth.

Although constantly on the lookout for problems which may be caused by the use of herbicides, the Branch has not yet discovered an incident in which herbicide residue has contaminated food products.

The Veterinary Services Division is concerned with effects of all types of pollution on animals, and because of the implications for human health, has worked in close liaison with the Department of Health — the final authority on all pollution problems and control. The Toxicology Section of the Veterinary Services Division examines submitted specimens for contamination from heavy metals such as mercury and other toxic chemicals.

To assist veterinarians to quickly recognize them in the field, the Division has reproduced under laboratory conditions, the symptoms and characteristics of illnesses in livestock which are caused by consumption of pesticides or toxic industrial effluents.

The Water Resources Division has the responsibility of monitoring ground and surface water in the irrigated areas of the province. Using 1,000 shallow wells strategically located throughout the irrigation areas, fieldmen regularly measure the change in the rate of solidity buildup in ground water and soils. Three times a year, the ground and surface waters are tested for pesticide residue. Personnel from the Division also serve on Regional Water Monitoring Boards to provide a link between local authorities and the services of the provincial government.

A number of agencies within the Department are co-operating in a program of education to control the spread of pollution. The Pest Control Branch, through public meetings, posters, and the radio, television and newspaper outlets of the Information Branch of the Extension Division, is teaching the correct use of pesticides and the proper disposal of containers. The same branch has also established a course in the correct method of pesticide application which is being offered at the three Alberta Agricultural and Vocational Colleges. The course is available both to those wishing to obtain commercial applicators' licenses and to individuals who want to learn the safest and most efficient way to use pesticides on their own land.

A number of interlocking committees within the department assist in developing programs of pollution control. The chief of these is the Food Residue Committee, made up of representatives from the Plant Industry, Animal Industry and Veterinary Services Divisions, which has the authority to initiate research programs and investigations. It also maintains a central registry of all pollution incidents and complaints involving agriculture and the public. Two of the main advisory committees assisting are the Interdepartmental Committee on Pesticides, with members from the provincial Departments of Lands and Forests, Agriculture and Health; the federal food and drug directorate and the University of Alberta; and the Alberta Advisory Committee on Pesticides which consist of members from provincial and federal governments, industry, conservation groups and consumers.



Water treatment is supervised by the Municipal Engineering Section of the Division of Environmental Health, Department of Health. Here, water is being chemically treated in outdoor lagoons.

Constant inspection prevents raw sewage in waterways

With three-quarters of Alberta's residences served by municipal water and sewage systems, the Municipal Engineering Section of the Department of Health ensures that insufficiently treated or raw sewage doesn't enter the province's waterways. Such action also ensures that unhealthy water is not consumed by the public.

The design engineering plans of all proposed waterworks and sewer systems are required for Provincial Board of Health approval, and this approval must be obtained before construction is proceeded with.

The Section conducts inspections of the systems throughout the year, and where deficiencies in water treatment, water distribution, sewage collection or sewage treatment are noticed, the municipality is required to correct the problem.

Increasing population and industrial discharge to municipal systems necessitates a constant re-

view of sewage treatment plants to ensure they can handle the load.

The Section also supervises the fluoridation of municipal water supplies. Each municipality maintains daily records with regard to fluoridation, and forwards these to the Section for checking and reviewing.

To ensure that trained operators are available for the province's sewage and water systems, the Section conducts annual schools, as well as correspondence courses. Operators may also be certified, depending on their education, experience, attendance at operators' schools and completion of correspondence courses.

Plans for public and semi-public swimming pools are reviewed by the Section before approval is recommended to the Provincial Board of Health. Upon completion of construction, an initial inspection is conducted by the Section and the local Health Unit.



Water pollution sampling crews busiest in winter



Winter being the time of year when waterway pollution is at its worst, the freeze-up of streams and lakes marks the beginning of a busy period for the Water Pollution Control Section of the Division of Environmental Health, Alberta Department of Health.

A regular system of lake and stream water testing is undertaken by Section crews, who manually collect water for laboratory evaluation at the various points adjacent to possible sources of pollution. In this way, they ensure that water meets the recently established criteria of the Provincial Board of Health. This testing takes up much of the staff's time during the winter, when ice cover and a decrease in flow volume accentuates any pollution problem.

From their analysis of both the water and any industrial or municipal waste effluents discharged into rivers, schedules are drawn up showing the acceptability of pollutants to individual streams and bodies of water, as well as entire river basins. Under these schedules, a level of absorption is established beyond which the water becomes polluted to an extent harmful to plant, animal or human life.

Although the water pollution control program is at its peak during the winter months, all seasons present specific problems. Industries which store wastes over the winter period are anxious to dispose of the accumulated material early in the spring. During the early summer months irrigation districts treat their canals for weed control. Some industries work only during certain seasons, and present special problems at that time.

The Section also reviews plans for proposed industrial plants with respect to potential water pollution and proposed controls. Plans for treatment of industrial wastes must receive Provincial Board of Health approval. This approval must be obtained before waste waters are released to any river, lake or other body of water.

Generally, prevention of water pollution is achieved by purifying waste waters to conform to Provincial Board of Health standards before discharge into the river. Pollution may also be prevented by developing alternate waste water disposal methods such as injection of toxic waste material into deep underground wells.

Most of the common pollutants in domestic sewage are easily handled by well-known and tested techniques — sedimentation, oxidation and chlorination. Industrial wastes present a much greater problem both in volume and complexity and special processing may be required for many of these materials. □

The unpleasant results of water pollution, left, destroy both the beauty and usefulness of lakes, streams and rivers. Although effluent is not a pleasant sight, careful control prevents it from polluting waterways.

Present river conditions assessed by lab

Experiments to establish the present biological condition of major Alberta river systems were started last fall by the pollution research biologist of the Fish and Wildlife Division, Alberta Department of Lands and Forests.

The experiments will show the present condition of the water to establish a base for measuring pollution levels in future years.

To do this, a sample of insects living on the bottom of the river is taken and analyzed. Five main groups on which fish feed are separated to determine what kinds, and how many of each kind, of these insects are present in the river. These groups are the nymphs and larvae of caddisfly, mayfly, stonefly, midge larva and worms. The presence of the first three indicate that the water is clean, while the other two live mainly in dirty or polluted water.

Samples are taken in the fall and spring to determine the effect of winter, which due to ice cover is the most critical pollution period of the year. Thus if a clean water insect is present in the fall samples, but is found dead in the spring sample while midge larvae and worms survive, there is an indication that the sensitive organisms were not able to tolerate conditions found in the river during the winter months. Samples are taken up-stream from major population centres and industry, as well as 15, 40, 100 and 200 miles below.

Since only fall samples have been taken to date, no data on the experiments will be available until next summer.

The river systems being tested are the Oldman, Bow, Red Deer, North Saskatchewan, Athabasca, Smoky and Wapiti. □



Well-planned landfills dispose of increasing amounts of waste

The supervision of solid refuse disposal systems is an activity in the field of pollution control in which the Public Health Inspection Section of the Alberta Department of Health has a primary role.

Solid refuse includes every unwanted or discarded article or thing which is not disposed of either as a gas or liquid or by suspension in a gas or liquid. It includes kitchen garbage, commercial wastes, old car bodies, industrial wastes, manure from feed lots, leaves and grass cuttings and countless other items.

Many communities are experiencing difficulties in disposing of increasing amounts of solid refuse resulting from urban growth and the changes in the standards and modes of living; difficulties in securing land adjacent to communities for land fills; desirability of improving disposal methods for the protection of health and for aesthetic reasons; unacceptability of incinerators which may add to air pollution; and the high cost of acceptable alternatives such as incinerators constructed to avoid air pollution.

Varied methods of solid refuse disposal are practiced in different parts of the world. These include composting; disposal to natural bodies of water; on site incineration by household or apartment incinerators; on site grinding and discharge to sewers; and feeding to animals. All of these have limited practicability in Alberta. The two basic methods which can be considered practical here are municipal or community incinerators and landfills.

The high cost of incinerators which can properly consume the solid refuse created in a community and not add to air pollution seems to limit the usefulness of this method of disposal. Such an incinerator may be viable when it can be located in an industrial area, where large quantities of refuse are created in the vicinity, and where transportation costs to other disposal facilities may be a factor.

By far the greatest quantities of solid refuse created in communities are disposed of in landfills. There is little, if any relationship between

a modern, properly operated landfill and the old open dump.

There are two types of landfills which are now accepted for use in Alberta. Both are governed by the Provincial Board of Health Regulations Respecting Refuse Disposal Systems.

The first type of landfill is the true sanitary landfill which is required for communities where the population exceeds 5,000.

A sanitary landfill is a fully planned operation on a carefully selected site. The municipality must obtain approval of the site and method of operation from the Provincial Board of Health. It is usually required that the site be at least 1,500 feet from any dwelling.

In the usual sanitary landfill, refuse is deposited in a prepared trench. It is then compacted — reduced in volume by driving a machine such as a front-end loader back and forth over it. Soil cover is applied daily where a population over 20,000 is served and three times weekly when the population is less. The compacted refuse should not be deeper than two feet. Successive covered layers are added on top of each other until the landfill is completed. The last application consists of at least two feet of soil.

The Provincial Board of Health has published design and operating standards for sanitary landfills.

There are several advantages to a properly situated, planned and operated sanitary landfill: solid refuse may be disposed of in a method which limits danger to health and usually does not give cause for complaints; the cost of the disposal facility is usually low in comparison with other methods.

Also with proper planning otherwise unusable land may be made useful for parking or for recreational facilities or for certain other purposes.

Although a sanitary landfill is an ideal way for disposal of refuse it may not be practical for a small community. In Alberta a community having a population of less than 5,000 is permitted to use a modified landfill. The typical modified landfill is similar to a sanitary landfill in that it

provides a trench to receive refuse. From time to time this refuse will be compacted and covered with soil, depending on the size of the community — at least monthly in those just under 5,000 population down to once or twice a year where only a few hundred persons are served. Burning is not prohibited but will only be permitted where and when it will not create offensive smoke.

Municipalities proposing to use modified landfills are required to plan the operation although the requirements are not as rigid as for a sanitary landfill.

There are many special problems in solid refuse disposal. Certain materials including many industrial wastes must receive special treatment.

It is not possible to set down general provisions. Each must be considered and instructions given. One particular problem which has come to the fore in recent years is in the matter of the disposal of old car bodies. Every year an increasing number of automobiles are removed from service. There is a market for the steel in these old carcasses but unfortunately it must be prepared to be acceptable to the steel industry. Non-ferrous material must be removed and the steel either shredded or compressed to a small block. This brings in a problem of economics as only under ideal conditions does the price of the scrap steel leave any margin above the cost of the processing which is required. There is little left to pay for transportation of the old car body over any great distance.

In some places old car bodies are permitted to accumulated until some change takes place which will enhance the economics of handling the scrap steel. In other instances the old car bodies are collected on a portion of the modified landfill site and periodically crushed and placed in the landfill. These remedies must be considered as temporary solutions.

The Regulations Respecting Refuse Disposal Systems make provision for supervision of such systems by the Provincial and Local Health Authorities. The permission of the Provincial Board of Health must be obtained before a new refuse disposal system can be established.

The views and opinions of the Health Unit or City Health Department of the area concerned are also considered and before permission to establish the refuse disposal system is granted. When a refuse disposal system has been established the Health Unit or City Health Department is required to provide public health supervision. □



Equipment such as this, far left, is used by the Fish and Wildlife laboratory of the Department of Lands and Forests to determine the concentration of a pollutant which is lethal to fish life.

The open dump, left, a common sight not so many years ago, contributed to both air pollution and general health hazards. This type of solid refuse disposal system is now being replaced by either sanitary landfills, or a modified landfill for smaller centres of population. The disposal of car bodies, above, continues to present problems since it is not economical to process them for scrap metal. In many places, they are gathered in an open area, preferably out of sight.

Conservation Board regulations control pollution of oil and gas field areas

In the many-faceted matter of pollution control, the Oil and Gas Conservation Board serves a significant role, with several of the regulations administered by it of particular interest to Alberta's rural population.

Enforced by the Board's field staff located in six centres throughout the province, these regulations pertain to control of air pollution, control of soil and surface water pollution from drilling and production operations, and protection of fresh underground water.

While the main responsibility for air pollution control in the province lies with the Division of Environmental Health Services of the Department of Health, in the case of the petroleum industry there is close co-operation between this Division and the Oil and Gas Conservation Board.

The Board's regulations concerning air pollution are designed to prohibit the release of hydrogen sulphide and to reduce the level of sulphur dioxide in the air so that no odor is apparent. Both of these pollutants occur in sour gas and oil fields. Hydrogen sulphide can be recognized by its odor of rotten eggs and sulphur dioxide has a sharp and acrid smell, much like burnt sulphur.

Soil and surface water pollution from drilling and production operations is prevented by controlling the manner in which salt water, oil, or drilling mud is disposed of at the surface.

Disposal of salt water is regulated to progressively reduce the amount stored in surface pits. As oil and gas fields are developed, producing companies are required to return salt water to its zone of origin.

Interdepartmental committee studies pesticides

The prevention of pollution which may be caused by the incorrect use of pesticides is a major responsibility of the Alberta Interdepartmental Committee on Pesticides. The committee was formed in 1965 as an operational, advisory and liaison committee for the Government of Alberta, under the Minister of Agriculture.

Composed of specialists from the health, agricultural and fish and wildlife agencies of provincial and federal governments and the University of Alberta, the committee can survey all matters involving the use of insecticides, herbicides, fungicides and other agricultural chemicals used in the province. Correctional procedures for any problems arising from this cause are recommended by the committee and put into action by the member department concerned. Subcommittees are appointed to handle such matters as the establishment of training programs for pesticide applicators, licensing of commercial applicators, and the development of new regulations for the control of the chemicals.

The committee also serves as a continuing medium of exchange of information on policies, programs and operations of various agencies which at times may have conflicting interests. The various member groups work together on all aspects of pesticide use, covering the broadest possible aspects of the subject. Recent problems considered include mercury residues in game birds and the use of DDT in Alberta.

A similar committee at the federal level in Ottawa co-ordinates the activities of federal disciplines in pesticide use and works with provincial groups across Canada. □

When a field is discovered, the Board will initially allow the disposal of reasonable amounts of salt water to an approved surface pit, but when larger amounts of salt water are produced, disposal to surface pits is reduced and these larger volumes of salt water are disposed to a deep well, usually back to the formation from which it was produced initially.

During the drilling and producing of a well, the Board makes regular inspections to ensure that drilling fluid or oil does not escape from the lease.

Final reclamation of the wellsite, if on surveyed land, is required by the Surface Reclamation Council, Department of Mines and Minerals. In unsurveyed territory, requirements of the Department of Lands and Forests must be complied with.

The Board is responsible for ensuring that fresh water occurring at shallow depths is not adversely affected by either of two activities. One is the drilling of nearby oil or gas wells.

To avoid the possibility of shallow water sands being contaminated by nearby oil or gas wells, the Board specifies that surface water must be protected by casing and cement to a depth of usually 600 feet or to 75 feet below any formation from which potable water is being taken within two miles of the drilling well, whichever is the greater.

Additional precautionary measures are necessary if the well is completed as a producer. Even though the surface casing and each inside string of casing is pressure tested to ensure that no leaks are present, the space between each casing string is required to be left open so that any leakage of oil or gas will come up to the surface, where it can be readily detected.

This procedure substantially minimizes the possibility of any oil or gas entering fresh water sands. At the same time these measures prevent shallow water from migrating within the well.

Drilling to obtain water for oil field flooding is the second activity which, if not regulated, could adversely affect fresh water at shallow depths. Much of the water used for oil field flooding is obtained from fresh water sands and is produced through shallow wells that are owned by oil companies.

It was during 1957, when underground water was first being considered in Alberta as a medium for improving oil recovery, that the Oil and Gas Conservation Board was authorized to licence such wells and to draft and enforce regulations to prevent harmful interference with domestic or municipal supplies.

Involved in designing these regulations were technical representatives of the Research Council

of Alberta, the Water Resources Division of the Alberta Department of Agriculture and the Oil and Gas Conservation Board.

The regulations vary depending on whether the oil company intends to obtain its water supply from river-fed gravels, from areas having a normal or abundant supply of underground water, or from areas having a shortage of underground water.

For all cases, it is required that certain measurements and data be taken at the well. The information is sent to the Research Council for its use in evaluating the area from which the underground water is being taken. In addition to requiring certain data, the Board notifies the appropriate oil company, each time its well is licensed, that the production of water may be restricted or prohibited if it is in the public interest to do so.

The regulations applicable to the very few wells completed in river-fed gravels have no additional restrictions because such gravels are considered to have an abundant and replenishing supply of water.

However, in areas having only a normal supply of underground water, the oil company is prohibited from producing water from the same interval that is being produced for domestic or municipal use within a distance of two miles.

Even more restrictive regulations apply to areas having a shortage of underground water. In such areas, the oil company may not produce from between surface and a depth of 500 feet and from even greater depths if deeper domestic or municipal wells should occur closer than two miles. A future provision prevents the oil company from producing from the Milk River Formation in an area of water shortage. This relatively deep formation is a common source of water for livestock over a widespread area of southern Alberta.

To assist the Oil and Gas Conservation Board in its efforts to control pollution and protect useful fresh water supplies, citizens are urged to advise the nearest office of the Board of conditions which could indicate a pollution situation. These include the smell of hydrogen sulphide or sulphur dioxide coming from a gas plant, gas or oil well battery. Another is oil or salt water escaping from a well or production battery area. Also, if it is felt that the drilling of oil or gas wells or oil company water wells is affecting a water supply, the Board should be advised.

Area offices of the Board are located at Edmonton, Drayton Valley, Red Deer, Black Diamond and Medicine Hat, with head office at 603 Sixth Avenue S.W., Calgary. □

Replacement of DDT urged

The Pest Control and Crop Protection Branch of the Plant Industry Division, Alberta Department of Agriculture has, for some time, recommended the replacement of DDT with new, less persistent and more effective pesticides.

The recent decision of the federal government to minimize the possibility of pollution from DDT by reducing the number of acceptable uses of the insecticide is fully in accordance with the recommendations made by the Alberta Department of Agriculture.

Although the provincial government has, at the moment, no control over the use of DDT, the department exercises great influence on pesticide selection through annual bulletins published by the Pest Control Branch.

Where the federal government has reduced from 62 to 12 the number of crops on which

the pesticide may be used, the Pest Control bulletins recommend use of the chemical on only two crops in the province. On all other crops, DDT has been replaced by an agricultural chemical which has been proven to be shorter lived and more effective.

Regulations are presently being developed which will allow greater control by the Department of Agriculture of the use of all agricultural chemicals, such as pesticides, herbicides and fungicides.

Presently, an extensive educational program is being carried out through the facilities of a number of divisions of the Department. Through farm broadcasts on radio and television, newspaper columns, posters and public meetings, users of DDT are advised on the proper application of the insecticide and on safe methods of its disposal.

Community noise recognized as pollutant

The effect of noise on the community will be studied by the Subcommittee on Noise of the Alberta Advisory Committee on Pollution. Inter-

national studies previously have established that noise can be considered an environmental pollutant.

The subcommittee will try to determine if community noise is a serious hazard, and if so, to what extent it is possible to introduce measures for abatement.

Community noise has many facets: urban and rural noise; residential and industrial noise; day and nighttime noise; commercial and private sources of noise; general and special area requirements, such as hospitals.

Industrial noise has long been recognized as a serious pollutant and major health hazard in industry.

In June, 1966, the Provincial Board of Health set out regulations establishing levels of noise allowed in industry. It states the period of time a worker may be exposed to a noise of a given decibel reading and a given sound frequency.

The Division of Industrial Health Services, Alberta Department of Health, acts as advisors to industry, and will measure the noise levels in work areas.

The Division has undertaken many studies since its start in 1964 to define and solve specific noise problems. □

Forest Service aids in control

The Alberta Forest Service, Department of Lands and Forests, assists in the enforcement of pollution control in the province's forested areas.

Officers of the Forest Service make regular inspection tours of sawmills, timber harvesting operations and all drilling and seismic sites in the green areas.

Officers ensure that refuse doesn't enter streams and rivers, and doesn't interfere with drainage patterns. At timber operations they advise on the location of skid roads and the size of cutting areas to prevent erosion and siltation. All seismic programs are inspected and special conditions prescribed, especially for stream crossings again to prevent siltation into streams and rivers. □

Test for lethal concentration

Tests are now being conducted by the pollution research biologist of the Fish and Wildlife Division, Alberta Department of Lands and Forests, to determine how much of a pollutant a fish can take before the concentration becomes lethal.

In the experiment, rainbow trout are used, since they are the most sensitive native species with economic importance.

The fish live for 96 hours in four tanks containing different levels of concentration of the pollutants. After this period, it is determined which concentration kills 50 per cent of the fish. A safety factor is added to this level, so all fish should be able to survive under the criteria recommended as a result of these experiments. □

Coming events

Within Our Borders is pleased to list those coming events pertaining to organizational meetings, association gatherings, and other similar non-commercial events of which it is made aware. Forward your information to Within Our Borders, Alberta Government Publicity Bureau, Centennial Building, Edmonton, Alberta.

FEBRUARY

1 *Junior League of Edmonton Convention* Edmonton
 1-28 *Banff School of Advanced Management* Banff
 2- 4 *Canadian Council of Community Colleges Convention* Edmonton
 3- 5 *Alberta Dairymen's Association Convention* Edmonton
 4- 6 *Alberta Emergency Measures Association of Canada Convention* Calgary
 5- 7 *Masonry Contractors Association of Canada Convention* Edmonton
 5- 9 *Prairie Urological Society Convention* Jasper
 6-11 *Canadian Construction Association Convention* Edmonton
 7 *Annual Ice Carnival* Lethbridge
 7 *Knights of Columbus Track and Field* Lethbridge
 8- 9 *Alberta Quick Freeze Association Convention* Red Deer
 9 *Concert Pipe Organ and Symphony Orchestra* Lethbridge
 12-13 *Alberta Teachers' Association Convention* Edmonton
 13-14 *Alberta Liberal Association Convention* Red Deer
 15 *Ski Competition* Lethbridge
 18-19 *National Association of Corrosion Engineers Convention* Edmonton
 19-20 *Alberta Teachers' Association Convention* Red Deer
 21-22 *Snowmobile Races* Wetaskiwin
 21-28 *Canadian Ladies Curling Championships* Calgary
 22-24 *Alberta Professional Photographers Convention* Edmonton
 23-Mar. 13 *Canadian Association for the Mentally Retarded* Banff
 26-27 *South East Alberta Teachers' Convention* Medicine Hat
 26-27 *Greater Edmonton Teachers' Association Convention* Edmonton
 26-28 *Alberta Fish and Game Association Convention* Edmonton
 26-28 *Western Canada Universities Modern Language Association Convention* Edmonton

27 *Anne Campbell Singers and Teen Clefs* Vauxhall
 26-Mar. 1 *Alberta Neurosurgical Society Convention* Banff
 28 *Fire Department Contest* Lethbridge
 28 *33rd Annual Hockey Tournament* Lloydminster
 28 *Second ACC Pilots' Seminar* Red Deer

MARCH

3 *Registered Music Teachers' Recital* Lethbridge
 3- 7 *Annual Music Festival* Lloydminster
 5- 6 *Agricultural Fair* Lethbridge
 5- 6 *Alberta Teachers' Association Central East Convention* Edmonton
 5- 6 *Alberta Women's Institute Convention* Red Deer
 6 *National Ballet of Washington* Edmonton
 6- 8 *Alberta Girl Guides Convention* Red Deer
 8-11 *Advertising Specialty Counsellors of Canada Convention* Calgary
 10-14 *Alberta Dance Festival* Lethbridge
 11 *Annual Meeting Hospital Pastoral Care Association of Alberta* Edmonton
 11-13 *Western Retail Lumbermen's Association Convention* Edmonton
 12-15 *Alberta Association of Chiropractors Convention* Calgary
 13-15 *Annual Girl Guide Convention* Medicine Hat
 14-15 *Kinuso Snowmobile Derby* Cold Lake
 14-15 *Dog Show* Edmonton
 14-15 *Progressive Conservative Seminar* Red Deer
 18-20 *Alberta Land Surveyors Association Convention* Edmonton
 19-20 *Canadian Gas Association Convention* Calgary
 21 *Silent Cities—Dead Cities of Mexico—Provincial Museum* Edmonton
 23-28 *Canadian Western Stock Show and Sale* Edmonton
 23-28 *Canadian Farm and Ranch Show* Edmonton
 25 *University of Lethbridge Concert Series* Lethbridge
 27-28 *Canadian Junior Volleyball Championships* Calgary
 27-29 *Canadian Amateur Ski Association Alberta Division Eastern Camp* Banff
 29-31 *Alberta Teachers' Provincial Association Convention* Calgary
 29-31 *Edmonton Safety Council Convention* Edmonton



Plumes of smoke were a common sight coming from this incinerator at an Alberta plywood mill, left, but a new stack installed by the mill has virtually eliminated this air pollution source.

Mobile labs, unmanned stations test air across province

Air pollution in Alberta is assessed and controlled by the Air Pollution Control Section of the Division of Environmental Health, Department of Health. This Section regulates the pollution from new industrial plants; assesses and causes to be reduced, where necessary, the emission of pollutants from industrial operations in the province and assesses the level of pollution in the urban areas.

Two mobile pollution laboratories are operated on a continuous basis throughout the province by technicians from the Section. These units are used to investigate and observe general air pollution levels in the vicinity of gas processing plants and in sour gas field areas. The operators also carry out at each location a survey of the area for all possible sources of pollution so that all results can be correlated.

The Section maintains approximately 175 unmanned exposure cylinder stations which are used to monitor the levels of sulphur gases throughout the province. These monitors are changed monthly and analyzed by the Environmental Health Services laboratory to determine if there are any trends.

Stack sampling surveys are carried out at major plants in the province to observe if the plants comply with the air pollution regulations, or operate within approved conditions. In the late summer and early fall the Section carries

out a detailed vegetation survey in the vicinities of gas plants to study the effects of sulphur dioxide on vegetation. The gathering of the samples is done in co-operation with the Department of Lands and Forests.

Detailed monitoring in Calgary and Edmonton is also carried out by the Section. The levels of a large number of pollutants is measured. These measurements help determine if the department's policies have been effective with regard to pollutant emissions. They also indicate which pollutants require further control.

The Section receives all the air pollution complaints from throughout the province and carries out detailed investigations and attempts to find corrective solutions for the complaints.

Legislation for the control of air pollution in Alberta has developed as the need, or anticipated need, arose. The first piece of legislation was to provide machinery to evaluate complaints and provide the remedy for correcting the conditions where necessary. A second item referred specifically to blowing dust from piles of coal and slag. These were enacted in 1945 and 1946 respectively.

In 1955 the authority to make regulations was added and in 1962 this was amended to include pipeline operation and location as an item subject to control.

The penalty for non-compliance with a Provincial Board of Health Order or rule or regulation for the control of air pollution, was set at the rate of up to \$500 per day in 1955.

The first specific regulations for the control of air pollution were formulated in 1961 and became effective on September 15 of that year. These define air pollution and an air contaminant as follows: "Air Pollution" means the presence in the outdoor atmosphere of any air contaminant in quantities that may cause discomfort to persons or endanger their health and safety, or that may cause injury or damage to property or to plant or animal life. "Air Contaminant" means any solid, liquid or gas or combination of any of them in the outdoor atmosphere resulting from the activities of man.

A basic requirement of the regulations is the submission of plans and specifications for all new industries and incinerators (except those for single family residences) to the Provincial Board of Health for approval. Existing air pollution

sources were given five years in which to arrange compliance with the regulation.

The method of applying for an Air Pollution Control Approval varies as to detail from one industry to another, but all applications must include a process summary and flow sheet with material balances, and information on the volume, temperature, velocity, contaminant concentration and stack height at each point of emission.

A follow-up to the Air Pollution Approvals is made through periodic assessment of the emissions by actual measurement of the emissions (in the case of larger sources this is once per year), and by monitoring the area for the specific contaminants involved.

A number of the larger gas processing and sulphur recovery plants in the province carry out their own program of area monitoring and emission evaluation and forward regular reports to the Department of Health.

Regardless of the air pollution problem to be attacked, whether it be a community-wide problem or merely a single-source problem, there are two fundamental approaches to control: the first being control of the pollutant at the source so that excessive amounts are not emitted to the atmosphere in the first place, and the second is natural dilution of the pollutant, after it has been emitted to the atmosphere, to such a concentration that man, animals, vegetation, and materials will not be harmed.

For industries developing entirely new products or processes, it is important to think about pollution problems in the research laboratory. With such an approach it may be found that other lines of research differing from those being followed may prove more promising; or, by developing a more expensive process, but one which reduces or eliminates the need for air pollution control equipment, it may be found that the overall production costs will be cheaper.

The best method of controlling air pollution confines the contaminant at its source. However, a second method, that of natural dilution of the pollutant in the atmosphere before it can reach the receptor in harmful concentrations, is also used. The natural dilution of contaminants can be accomplished by use of tall stacks, community planning in which zoning the use of the air is the primary object or restricting plant operations under adverse weather conditions. □